

REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Official Action dated June 18, 2004. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Information Disclosure Statement

Applicants respectfully request the Examiner to acknowledge the Information Disclosure Statement (IDS) filed February 7, 2002, in conjunction with the filing of the above-referenced application, and to provide a copy of the acknowledged form PTO-1449 that accompanied that IDS in due course.

Status of the Claims

Claims 1, 2 and 4-10 are under consideration in this application. Claims 1-2 and 8-9 are being amended, as set forth in the above marked-up presentation of the claim amendments, in order to more particularly define and distinctly claim applicants' invention. Claims 3 and 11 are being canceled without prejudice or disclaimer, wherein the recitation of claim 3 is being incorporated into claims 1, 2, 8 and 9.

Additional Amendments

The claims are being amended to correct formal errors and/or to better recite or describe the features of the present invention as claimed. All the amendments to the claims are supported by the specification. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Formal Rejections

The Examiner rejected claim 11 under 35 U.S.C. §112, first and second paragraphs, on the grounds that the specification fails to provide disclosure for the subject matter recited therein, and for as being indefinite, respectively. As outlined above, claim 11 is being canceled without prejudice or disclaimer, thereby rendering the formal rejections moot.

Prior Art Rejections

The Examiner rejected claims 1-3, 5-6 and 8-11 under 35 U.S.C. 103(a) on the grounds of being unpatentable over Girt et al. (US Patent No. 6,645,614). Claim 4 was rejected under 35 U.S.C. 103(a) on the grounds of being unpatentable over Girt et al. '614 in view of Wang et al. (US Application No. 2002/0098389). Claim 7 was rejected under 35 U.S.C. 103(a) on the grounds of being unpatentable over Girt et al. '614 in view of Sakawaki et al. (US Application No. 2002/0160234). Applicants strongly but respectfully traverse the above-rejections.

The present invention as recited in claim 1 is directed to a magnetic recording medium comprising: a substrate; an underlayer formed over the substrate; a magnetic recording layer formed directly on the underlayer, having a first magnetic layer, a second magnetic layer and, a non-magnetic intermediate layer formed between the first magnetic layer and the second magnetic layer, wherein the first magnetic layer consisting of Co, Pt, and Cr and formed directly on the underlayer. The non-magnetic intermediate layer contains at least one element selected from the group consisting of Ru, Ir, and Rh. The second magnetic layer contains Co as a main component. The first magnetic layer and the second magnetic layer are magnetized in the antiparallel direction in the absence of an applied magnetic field, and the amount of Pt contained in the first magnetic layer is no less than 3 at% and no more than 9 at%. The underlayer is formed to include Cr and Ti.

According to claim 2, the present invention is directed to a magnetic recording medium including a substrate and a magnetic recording layer formed thereon with an underlayer interposed between them. The magnetic recording layer comprises: a first magnetic layer containing Pt formed directly on the underlayer, a second magnetic layer, and a non-magnetic intermediate layer formed between the first magnetic layer and the second magnetic layer. The first magnetic layer and the second magnetic layer are magnetized in the antiparallel direction in the absence of an applied magnetic field, the amount of Pt contained in the first magnetic layer is no less than 3 at % and no more than 9 at %, wherein the magnetic recording layer is formed directly on the underlayer. The underlayer is also formed to include Cr and Ti.

According to claim 8, the present invention is directed to a magnetic storage which comprises a magnetic recording medium, a drive unit to turn the magnetic recording medium, a magnetic head consisting of a writing part and a reading part, a means to move the magnetic head relative to the magnetic recording medium, and a signal processing unit to send and receive signals to and from the magnetic head, wherein the reading part of the magnetic head is a giant magneto-resistive effect element or has a tunnel junction which produces the magneto-resistive effect. The magnetic recording medium is comprised of: a substrate; an underlayer formed over the substrate; and a magnetic recording layer formed directly on the underlayer, having a first magnetic layer, a second magnetic layer and, a non-magnetic intermediate layer formed between

the first magnetic layer and the second magnetic layer, wherein the first magnetic layer consisting of Co, Pt, and Cr and being formed directly on the underlayer. The non-magnetic intermediate layer contains at least one element selected from the group consisting of Ru, Ir, and Rh. The second magnetic layer contains Co as a main component. The first magnetic layer and the second magnetic layer are magnetized in the antiparallel direction in the absence of an applied magnetic field, and the amount of Pt contained in the first magnetic layer is no less than 3 at % and no more than 9 at %. The underlayer is formed to include Cr and Ti.

Finally, according to claim 9, the present invention is directed to a magnetic storage which comprises a magnetic recording medium, a drive unit to turn the magnetic recording medium, a magnetic head consisting of a writing part and a reading part, a means to move the magnetic head relative to the magnetic recording medium, and a signal processing unit to send and receive signals to and from the magnetic head, wherein the reading part of the magnetic head is a giant magneto-resistive effect element or has a tunnel junction which produces the magneto-resistive effect. The magnetic recording medium is comprised of a substrate and a magnetic recording layer formed thereon with an underlayer interposed between them, wherein the magnetic recording layer incorporates a first magnetic layer containing Pt formed directly on the underlayer, a second magnetic layer, and a non-magnetic intermediate layer formed between the first magnetic layer and the second magnetic layer. The first magnetic layer and the second magnetic layer are magnetized in the antiparallel direction in the absence of an applied magnetic field, the amount of Pt contained in the first magnetic layer is no less than 3 at % and no more than 9 at %, wherein the magnetic recording layer is formed directly on the underlayer. The underlayer is formed to include Cr and Ti.

Applicants respectfully contend that neither Girt et al. '614 nor any other cited reference teaches or suggests forming the magnetic recording layer consisting of Co, Pt and Cr directly on the underlayer that includes Cr and Ti.

Contrary to the Examiner's assertion in the Office Action, Girt et al. '614 in actuality discloses that the underlayer 12 includes a first or lower portion 12A, and a second or upper portion 12B. The lower portion 12A is an amorphous or fine-grained seed layer formed with Cr-Ti, while the upper portion 12B is a polycrystalline underlayer made of Cr or a Cr based alloy. The upper portion 12B is formed against a lower ferromagnetic layer 13_L. The lower ferromagnetic layer 13_L is formed from a Co alloy having at least one of Pt, Cr, B, Fe, Ta, Ni, Mo, V, Nb and Ge (see col. 8, lines 12 - 46). Based on the above, Girt et al. '614 does not disclose, teach or suggest any structure by which a magnetic recording layer consisting of Co, Pt and Cr is directly formed on an underlayer that includes Cr and Ti. Rather, there exists another layer 12B between the magnetic recording layer and the CR-Ti underlayer. Consequently, Girt et al. '614 can neither anticipate nor render obvious each and every feature of the present

invention as claimed.

Girt et al. '614 is deficient in showing all the features of the claimed invention. However, none of the other references which are only cited as secondary references to show very specific features provide any teaching or suggestion to make up for these deficiencies. As such, those same secondary references cannot be used to sustain any rejection such that any of the features of the present invention as now claimed can be rendered obvious by those references, either individually or in combination.

Applicants will contend that the present invention is thus as a whole distinguishable and thereby allowable. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

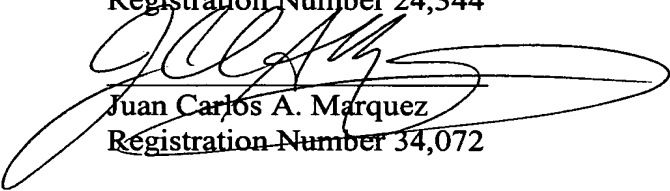
Conclusion

In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art reference upon which the rejections in the Office Action rely, Applicant respectfully contends that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and phone number indicated below.

Respectfully submitted,

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